

Smith (H. J.) & Michiner (C. B.)

# A PLEA FOR VETERINARY SURGERY,

BY

HORACE J. SMITH,

*George's Hill, Philadelphia,*

TO WHICH IS APPENDED A REPORT ON

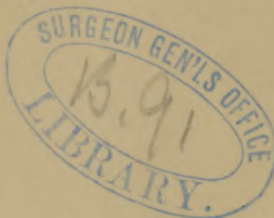
EPIZOOTIC, PLEURO-PNEUMONIA, AND HOG CHOLERA,

BY

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*Veterinary Surgeon Pennsylvania Board of Agriculture.*

TAKEN FROM THE REPORT OF THE BOARD, 1877.



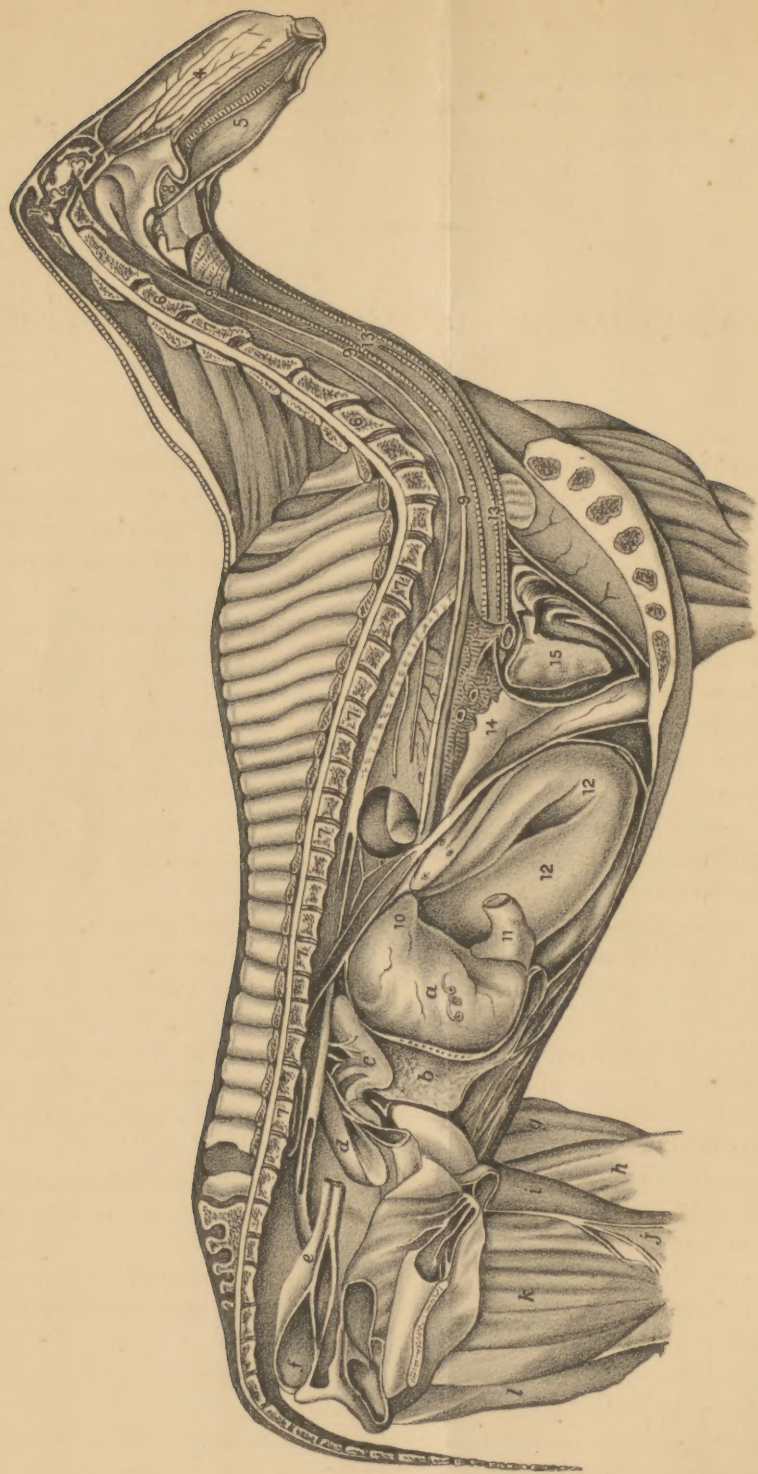
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*Longitudinal Section of the*  
**TRUNK of the HORSE.**



If fairly administered, such a law, while it protects the farmer from imposition, will also protect the honest manufacturer from a ruinous competition with dishonest men, who, by an inferior article, can undersell others.

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## EXPLANATION OF LONGITUDINAL SECTION OF HORSE.

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1, Occiput; 2, Cerebellum; 3, Cerebrum; 4, Nasal Mucous Membrane; 5, Tongue; 6, 6, Cervical Vertebrae; 7, 7, 7, 7, Spinal Cord; 8, Larynx; 9, 9, 9, Oesophagus; 10, Cardiac orifice of the Stomach passing through the diaphragm; 11, Pylorus; 12, 12, Posterior surface or abdominal aspect of diaphragm; 13, 13, Trachæ; 14, Lungs; 15, Heart.

A, Stomach; b, Spleen; c, Left Kidney; d, Broad ligament of the Uterus with left Cornu and Ovary displayed; e, Rectum; f, Anus; g, h, i, j, k, l, Internal muscles of thigh.

The above cut represents most of the principal organs which are displayed by a longitudinal section of the horse. It can not but be of benefit to mention the most prominent diseases which affect the different parts.

1, *Occiput*. Here we find the seat of that dire disease known as "Poll Evil," a disease which unfortunately too many of our farmers, in certain localities, have had to contend with.

2, *Cerebellum* and 3, *Cerebrum* constitute with the Isthmus of the Eucephalon, the brain. The cerebellum is situated posteriorly, and consists of a single lobe; while the cerebrum, in front of this, is formed by two lobes. The cerebrum is the seat of sense and intelligence, the cerebellum that of coördination of voluntary motion. The diseases which affect the brain are special injuries as concussions, fracture of skull, &c., Eucephalitis or Phrenitis, Vertigo or Megrins, Apoplexy, Red and White Softening, Hydrocephalus, &c., &c.

4, *Nasal Mucous Membrane* is frequently the seat of acute inflammation constituting simple catarrh or chronic inflammation, taking the form of nasal gleet.

Polypi are often formed within the cavity of the nose, and give rise to *roaring*. This membrane is likewise the seat of the *characteristic* ulcers of glanders.

5, *Tongue*. This organ is seldom affected in the horse. Simple inflammation, Glossitis, is by far the most frequent trouble.

6, 6, *Cervical vertebrae*. This bony column suffers dislocation, either *partial* or *complete*: but is of rare occurrence. A more common result of

injuries is Acute Periostitis, inflammation of the membrane covering the vertebræ, a disease characterized by excruciating pain and stiffness of the entire neck.

7, 7, 7, 7, *Spinal cord*. Simple congestion of the cord, giving rise to Paraplegia; and Spinal Meningitis are the principal lesions.

8, Larynx Laryngitis in the horse, is a *specific* disease, easily transmissible, and appears under two forms: Acute, (by some called Malignant Sore Throat,) and Sub-acute.

9, 9, 9, Oesophagus, *Dilatation* of the Oesophagus, and the formation of *pouches*, due to rupture of the external or muscular coat, allowing the internal one to be forced through the opening, and thus forming a sac, is the principal pathological lesion. These dilatations are either *Cervical* or *Thoracic* according to their locality. *Stricture* of the oesophagus is not uncommon. Inflammation of the Oesophagus often follows irritating drenches or results from direct injuries applied to crush apples or other substances which have become lodged in it.

10 and 11, The *Orifices* of the stomach are not often affected per se, *thickening* and *constriction* being the most likely to occur.

12, *Diaphragm*.—This is subject to spasmodic contractions, known as Spasms of the Diaphragm; this curtain frequently suffers *rupture*, from the great pressure of the stomach and bowels when overdistended with flatulence.

13, 13, *Trachea*.—Inflammation of the mucous lining of the trachea is often met within practice. Sometimes we see *fracture* of the rings of the trachea from external injuries. This gives rise to roaring.

14, *Lungs*.—The lungs with their lining membrane, the pleuro, are affected with the following diseases: Pneumonitis, Acute, Sub-acute, and Chronic, Phthisis, Pleuro pneumonia, Hemorrhage, Emphysema, Bronchitis, Capillary Bronchitis, Pleurisy, and Hydrothorax.

15, *Heart*.—The diseases most often met with of the heart and its membranes are: Pericarditis, Hydrops, Pericordii, Degeneration of either *Fatty* or *Calcareous*, Carditis, *Dilatation*, *Enlargement*, *Insufficiency* of the valves or degeneration of same, Endocarditis, Rupture of the Pericordium, Rupture, Polypus, and the formation of different tumors. The presence of air in the heart or the formation of an ante-mortem heart clot betoken speedy death.

a. *Stomach*.—The stomach of the horse suffers less from disease than that of Ruminants. The principal affections are: Polypi, Concretions, Presence of Bots in undue quantities, Gastritis, Engorged stomach, (often called Stomach Staggers, from its sympathetic action on the brain,) Tympanites, and Rupture.

b. *Spleen*.—If we except Splenic Apoplexy among cattle, the diseases of this organ are not of frequent occurrence, or are frequently entirely overlooked. The following, however, have been noticed: Splenitis, Degenera-



tions of, Hypertrophy of, Rupture of its capsule, and the presence of melanotic tumors.

*c. Kidneys.*—These organs are subject to Acute and Chronic Nephritis, Abscess, Bright's disease, Diabetes Mellitus, Renal Calculi, Haematuria, and suppression of urine, Induration, Scirrhus, and Hypertrophy some times exist. Albuminuria exists in connection with Bright's disease. Some cases of Melanosis have also been met with.

*d. Womb.*—The womb of the mare suffers Prolopsus and Inversion, principally, but is also affected with inflammation, Metritis, and Hydrometra.

The *Ovaries* are likewise subject to Dropsy, Hypertrophy, Melanotic, and Scirrhus enlargements.

*e. Rectum.*—In the horse, as well as man, though much less frequently, we have the presence of Haemorrhoids or Piles. Rupture of the rectum from the careless use of the injection pipe, is met with too often, and shows the necessity of exercising the greatest care in performing so simple an operation as giving an injection.

*f. Anus.*—Prolopsus Ani, though sometimes met with, is not of frequent occurrence.

In presenting above, in the limited space allowed me, nothing more than a *skeleton* could be given. To write a description of each organ and the diseases incident to them would fill volumes.

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CARVERSVILLE, PA.

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## A PLEA FOR VETERINARY SCIENCE.

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BY HORACE J. SMITH, *George's Hill, Philadelphia.*

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It may seem presumptuous for one unversed in a technical subject to take it up with the hope of elucidating it; but a sincere desire, long indulged, to promote the elevation of the veterinary art, prompts me to urge the importance of a liberal endowment of a veterinary school in the University of Pennsylvania, and for a larger number of highly educated veterinarians. "Whatever may have been done to increase the public stock of knowledge in other departments, the veterinary science hath been hitherto little cultivated in this country; nevertheless, if its claims to public favor were fully stated, there could be no doubt but that our national spirit and benevolence would patronize it equally with every other branch of natural knowledge. The treatment of our cattle hath been restricted to

those who are most remarkably unqualified to undertake the charge. There was a time when human health was largely confided to the barber; and at that period medicine was much in the same state in which we see the veterinary art at this day." These extracts from an appeal made in 1791, for the establishment in London of a veterinary college, are so true of our own time and country, and the appeal was followed by such success, that they are copied here.

This incompetency of the persons to whom it has been abandoned, has drawn contempt upon the veterinary art itself, and few have ventured to concern themselves with a profession that seemed incapable of conferring any honor upon those who exercised it. It requires the sacrifice of as many years to become a skillful veterinarian,\* as to become a skillful physician; and the veterinarian should add to his professional knowledge, a peculiarly active mind and penetrating judgment. The advantage of extending the influence of science to our farms, and applying it to the preservation of our cattle, is evident when we consider the ravages sometimes made among them by contagion and epizootic diseases, the virulence of which would certainly yield to a judicious and scientific treatment. Doctors of medicine, one hundred years or more ago, both preached and practiced nonsense, and were the merest quacks and empirics, if we may trust the descriptions in Gil Blas and those of Captain Marryatt. The present great era of scientific enlightenment has happily begun to establish a true basis for the practice of medicine and surgery; and mechanical appliances, and chemistry, and microscöpy, and other sciences have facilitated the elevation of the therapeutics from the comparatively low stage in which men of this generation found it.

The social status of the medicine man fell to the rank of Chirurgéon† barber and bleeder; but the inherent nobility, however, which pertains to every lover of natural science, their notable self-sacrifice for the benefit of mankind, and their indefatigable pursuit of knowledge, which are characteristics of the profession, have now raised physicians to a most deserved eminence. The growing catholicity of science is now inviting even the cow doctor to take his degree from the hands of *Præses et Professores* of the highest personal dignity and acquirements; and this class is the next one to be lifted from the region of jeers, once freely flung at the saw-bones and sangrados. The present is a great era of emancipation from dogma and prejudice, and it is the duty of the scientist, and the humanitarian, and he who would increase the wealth of the country, to join in promoting the fullest and the broadest scientific education of the veterinary. Vulgar prejudice and contemptuous opinion of the veterinary art or anything human, natural, or divine, is a barrier to the enlightenment of the

\* I would like to use the words Omni-path or Zoo-path, for him who treats all animals, and Uni-path or Andro-path for him who treats *only one* animal, man; but I find no precedent.

† Chirurgéon, one who works with his hands.



mind which entertains it, and they are surely passing away. Barbarous punishments for criminals,<sup>‡</sup> and brutal treatment of the insane were in vogue in the United States since the Declaration of Independence; but now, under the silent pressure of civilization, such practices are repudiated as palpably and atrociously inhuman. The Pennsylvania Society for the Prevention of Cruelty to Animals was, by a grim coincidence, organized during the years when Pennsylvania sent thousands of her gallant sons to the dire work of slaughtering rebels. The next step of humanitarian progress, after preventing cruelty, should be to promote the scientific and merciful treatment of sick animals, by establishing veterinary schools. We do not employ the shoemaker to diagnose human diseases, and it is quite necessary that a man more highly trained in obstetrics than the blacksmith should treat the sick cow. The farrier, following the heroic treatment of the physician of thirty or forty years ago, fires and bleeds his victims, and too often is merciless in his ignorance, and guilty of the grosest brutality. I will stain these pages with the record of but one instance of modern guilty ignorance and horrible cruelty practiced by a *professed veterinarian*, but there is a desperate amount of cruelty practiced. No, I will not call it cruelty, but suffering inflicted in our barns, which far surpasses that which occurs in our city streets.

"A medical man, eminent in the profession, and of large experience, being in the country, was told that one of the horses belonging to the family was sick, and went out to where the animal was. He found him much swollen and evidently suffering the most intense agony. The "horse doctor" had been there and gone, having administered (as was discovered subsequently,) a halfounce of *strong nitric acid*! but it had given as yet no relief!! Inquiry as to the condition of the bowels, and the appearance of the sufferer, led the doctor to diagnose it as a case of colic, resulting from impaction. He at once went to work in a common sense way to relieve it. Having greased his hand and arm he introduced them into the rectum, found and removed with some effort a large amount of hardened feces, and was rewarded for his trouble by the proof he immediately had that his diagnosis was a correct one. The evacuation of the rectum was followed by an enormous discharge of pent up flatees, and the poor beast showed signs of great relief. In a day or two Dr. . . . was told that the horse was dead, and being present at the post-mortem, he saw as, he had expected, evidence that the dose had done its work too surely. The œsophagus and stomach were in a state of intense inflammation, and in some places corroded deeply by the action of the acid; so much as to cause perforation, and in his view, the fatal result was entirely due to the same. In other words, a simple case of colic, from obstruction of the bowels, had been converted into one of violent enteritis by ignorant malpractice. The author of this crime is Dr. . . ., V. S., who keeps a blacksmith and wheelwright shop."

Veterinary art will naturally be degraded by its remaining a trade in the hands of ignorant and brutal farriers, but when it shall be taught in a scientific manner, at our highest institutions of learning, men of liberal education will cease to look upon the profession as a mean or degrading one, and be tempted to enter its ranks. It would seem unnecessary to enlarge on the importance of this subject, which has been left in its present

<sup>‡</sup> Burglary was punished one hundred years ago in Vermont by branding, nailing an ear to a post, &c.

abject condition by public supineness. There are signs; however, that this lethargy is about to be thrown off, and that we are on the eve of a new era. This change is being vigorously promoted, by the scientific ardor of such men as Professor Liautard, of the American Veterinary College, of New York; Professor Law, M. D. V. S., at Cornell; Doctor Lyman, of Massachusetts, and the unselfish labors of Doctor Gross, Professor Antisell, and others. Whether the outcome shall be that veterinary departments shall be grafted on our medical schools, or the establishment of other veterinary colleges, or of one national veterinary institution, will depend upon the exertions of the friends of the cause who favor one or the other of these methods. When apathy shall be replaced by interest, veterinary science, at one bound, will take its just place alongside of other sciences, and its liberally educated professors find that equal rank with other gentlemen, which their personal character, and the importance of their services demand. Certainly the time has fully come for schools teaching branches of knowledge of practical utility and benefit to the great producing class of the country—the farmers. It is asserted that five sixths of all our exports are agricultural productions, and that our soil is being impoverished, and our farmers beggared to make annual remittances for all classes of men who barter or trade with foreign countries. Science has too seldom intentionally stooped to lift the special burdens which lie so heavily upon the tiller of the ground, but has rather occupied itself with and fostered every other branch of industry. It has only occasionally or incidentally given its attention to help to promote the agricultural interests, which are the first, the best, and the truest interests of the country, and those on which all others depend. Relief, in one direction, can only be obtained by training up a body of men whose studies have been specially directed to the subject of veterinary science, and hence it is incumbent on this nation to institute and foster veterinary schools of the highest grade.

The surroundings that must be gathered together to develop a veterinarian are, professors thoroughly trained as specialists, an extensive museum of costly specimens, a hospital and clinics where morbid anatomy can be displayed, and practical surgery witnessed, and forges where shoeing can be illustrated. In a college for teaching medical science, fifteen or twenty masters are needed to educate pupils for treating one animal—man; many of these and other specialists, in addition, are needed to perfect the zoöpath. For the veterinarian has to treat the fowls, the carnivorous dogs, the ruminants, and the horse, and it would seem (if one star must differ from another star in glory) the omnipath should be a man of fourfold breadth of mind and training and knowledge, compared with his unipathic brother.

There are numerous diseases which attack animals only, and thus affect the welfare of the community; but there is another and a fearful catalogue of malignant diseases which are also communicable to mankind, prominent among which is rabies. There should be a general diffusion of informa-



tion on the preliminary symptoms and course of that fearful malady, hydrophobia. The importance of stringent legislation, for the extinction of glanders and fury, will hardly be disputed by any one at all conversant with the subject. The danger of the loathsome infection implicating other animals, and, above all, the human being himself, demands that we should have a summary legal process for destroying every beast whose glanderous deposits are softened and discharging. Redress, that comes only after the affected animal has diffused disease and death, in their most loathsome forms to man and beast, is no redress. We should have swift legal means for putting a stop to the immoral, inhuman, and homicidal practice of keeping such creatures alive.

This brings up the very important question of legislation on these matters, so fraught with interest to the individual and the community. Governmental interposition can only be justified when the legislators are illumined and guided by trained specialists in veterinary science, whose intelligence compels respect. European governments have legislated largely and acted vigorously on questions affecting communicable diseases, and the necessity may be upon us to act promptly under the spur of dread necessity. God grant we may have wisdom in the council, and knowledge in its advisors. Every board of health should have one or more specialists in animal diseases, either to sit in the board or as its regular adviser. It is quite as imperative that it should have a zoöpath as an andropath, seeing that human health is to such an extent dependent on animal health and hygiene. Such an officer would have abundant occupation, if he was authorized to stop any milkman at any time and inspect his fluids, some of which are sometimes tainted with diseases, as well as mixed with water and other foreign substances. At the abbatoirs and slaughter pens, he should be authorized to rule out diseased animals; in the market, to condemn slippery veal and pork, mutton, or beef, or fish unfit for human food. There is too much meat sold of animals suffering from malnutrition? (which results in deterioration of the tissue,) of starvation, and foot-rot, or from being killed when heated from overdriving.

These questions are treated at length by George Fleming, a gentleman of a high order of mind and extensive travel, in his book "Veterinary Science and Police." (This and his other important work on "contagious diseases" are re-published by William Wood, 27 Great Jones street, New York.)

The American Medical Society at its meeting in 1870, at Washington: *Resolved*, "That we recommend the Governor and State Legislature when organizing boards of health, to appoint one or more thoroughly educated veterinary surgeons to be associated as commissioners with other medical officers." But we not only need local officers but federal veterinary surgeons also at ports of entry, who shall quarantine sick animals as rigorously as yellow fever patients are quarantined. We cannot afford with foreign intoxicants to import rinderpest. It is fearful to bring in murder and poverty hooped up in casks and maudlin drunkenness in bottles, but



at least let us save our poor animals from the desolating ravages of diseases not now known among us. The National Government takes some cognizance of veterinary science by appointing a farrier to every regiment of cavalry, and has a school for farriery at West Point. The military power in all States and in all ages has appreciated the necessity of good mounts, seeing that the trains, the light artillery, and the scouts as well as the heavy cavalry depend upon that useful animal, the horse. But it is imperative that our Government should be forced to give more recognition to veterinary science than it does, and that immediately. We have entomologists on the Agricultural Bureau staff, governmental entomologists studying in the field the habits of insects, the eminent Professor Baird and others promoting fish culture, Professor Hough studying up forestry and making project *du loi* for Congress on that subject, and yet an industry more vital than either, on which it is not too much to say the whole wealth of the country depends, is left *without Government recognition, without schools, without appreciation, and even its scientific votaries laughed at, derided, and held in social disrespect*. Do my countrymen treat any other science thus? are they wise to neglect it any longer?

If we reflect on the value of our live stock and the dangers that even now threaten us because of this neglect of veterinary science, we will come to appreciate that our nation can no longer afford to hold in contempt a merciful protective art, thus driving our young men ever susceptible to sneers, away from its study. The following paper by Professor James Law, M. D. V. S., of Cornell's University, New York, written specially for this report, gives a succinct history of veterinary science, its importance to the medical profession, and the country.

#### History of Veterinary Medicine and Surgery.

The application of medicine and surgery to animals may be held as coeval with the domestication of the animals themselves. As man would instinctively stanch the flowing blood by pressure or bandage in the case of a wound in a fellow man, so would he seek to arrest a fatal result in those animal possessions that furnished him with support, nourishment, and dignity. And the domestication of animals is that which first characterizes the civilized man, as contradistinguished from the savage. Man's mundane supremacy was at first predicated of his subjugation of the lower animals—of his "dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth."—Gen. i: 28.

The lowest savage lives by hunting or fishing, and tames, first, the carnivorous animals and rapacious birds, to assist him in that pursuit by which they all in common live. In the subjugation of the herbivore, he acquires a provision against scarcity and famine, clothes himself with wealth and importance, and realize the need of fixed laws, and a sound administration of them. The next step is in the possession and cultivation of a distinct tract of land, which, from a common property, comes to be

recognized as a tribal or family entailment, with all the attaching responsibilities of fixed local government, and political and social relations. Thus the domesticated animals have been held in the highest estimation by all the earlier nations of mankind. To use the words of Henssinger: "They have, in no slight degree, influenced the moral and intellectual development of man; his religion, his character, his manners, his language, his poetry and his arts bear their impress; they live in his songs, and they inhabit his heaven."

The esteem in which live property was held, would early develop remedial devices, however crude or mistaken, in case of disease or injury. Ainslie believes, that the Parsees and Hindoos had their veterinary physicians, and their works on veterinary art. Among the Hindoos, the apotheosis of animals is maintained to the present day, and is made subservient to human, as well as religious, purposes, as witnessed by their existing animal hospitals. Egypt preserves works of ancient art, representing veterinarians treating oxen, gazelles, and fowls, with inscriptions, descriptive of the subjects. Quatremere finds traces of a Sanskrit work, dating as far back as the Babylonian Empire, and treating of the breeding and care of horses, so highly esteemed in all ages in Persia and Arabia. The Jewish law, in its injunctions against sacrificing the diseased and mutilated, against the use of that which had died of itself, and against the consumption of swine, which are so liable, in unclosed lands, to propagate parasites, alike dangerous to themselves and to man, furnishes the germs of a sanitary system, beneficial alike to man and beast. The ancient Greeks are, however, the first to have left us distinct treatises on the diseases of animals. When the great pestilence fell on man and beast, at the siege of Troy, and the plague-stricken Greeks sought to appease the wrath of Apollo by sacrifice, it is evident that sounder views were not lacking, since Agamemnon ordered the purifying of the camp, as a necessary adjunct. That efficacious means were not unknown, may be inferred from the fact, that Ulysses used sulphur fumes to purify his polluted house on his return. Later, we find Hippocrates mentioning the veterinary profession, and deducing from the dissection of diseased animals, theories on dropsy, epilepsy, &c. So with Diocles and Aristotle, the latter of whom describes certain diseases of the horse, ass, ox, pig, dog, and elephant, and even of fishes. Mago, of Carthage, in his great work on agriculture, described some of the diseases of animals. Later, in the beginning of the Christian era, Varro, Columella, Pellagonius, Palladius, Apsyrtus, and a host of others, wrote at length on veterinary matters. There remained, of course, a dense mass of superstition and absurdity; but the Greeks of this age stand out as illustrating the early dawning of a rational veterinary medicine. Under the influence of luxury and superstition of the Roman Empire, a decadence ensued in this, as in other arts; and during the dark ages, we find nothing better than charms and incantations, branding the sick animals with the sign of the cross, the uttering of priestly prayers, and the

undertaking of penitential and propitiatory pilgrimages, all which, in the case of the more destructive diseases—the contagious—only tended to increase their prevalence and mortality.

The art was revived somewhat in the twelfth century, and first by the labors of Jordanus Ruffus of Calabria, and again it received a great impetus in the end of the sixteenth century, from the investigations of Carlo Ruini, a Senator of Bologna, who published an admirable work on the anatomy of the horse. But it was reserved for the eighteenth century, and notably for the nineteenth, to found the modern veterinary schools, to subject the veterinary art to the strict principles of modern science, to investigate the local and general causes of animal diseases, and to show how sick animals may be restored by a scientific application of medicine and surgery, how enzootic diseases may be permanently eradicated and epizootic diseases expelled and excluded.

The terrible ravages of the animal plagues at frequent intervals, were mainly instrumental in leading to the resuscitation of the long neglected science. During every great European war, from the day of Atilia downward, these had been carried from their permanent homes over the fair fields of Europe, and added the dread pestilence and famine to the ruin already wrought by fire and sword. In the first half of the eighteenth century, in connection chiefly with the war of the Spanish succession, these plagues carried off no less than two hundred million head of cattle in Europe. France having suffered severely through the whole of this period was induced by her continued losses to establish the Lyons Veterinary College in 1762, and a year later that of Charenton, now removed to Alfort near Paris. Still later a third college was established at Toulouse, all three being under the direction and support of the State. The second country to recognize the importance of such a step was Austria, which established its veterinary school at Vienna in 1767. Prussia followed the next year with the school at Berlin, and this was succeeded by those of Munich, Dresden, Hanover, Stuttgart, and Karlsruhe. Spain established *one* school, Italy *four*, Holland *one*, Switzerland *two*, Denmark *one*, Sweden *one*, and Russia *two*.

These twenty-two colleges were all under Government patronage and support, and their good effects were increasingly shown, not only in the better case of animals in health and disease, but in the extinction of local causes of ill health, and above all, in the control of those plagues which had led to their creation.

England failed to avail of the example set her, but, in 1791, under the auspices of an agricultural society in Kent, "The Veterinary College of London" was instituted as a private corporation, and having no connection with the Government. A similar independent school was established in Edinburgh, in 1818, under the patronage of the Highland and Agricultural Society. A third and fourth now exist in Edinburgh and Glasgow, respectively, established like their predecessors, as private ventures. The systematic neglect of veterinary science by the English Government, has



entailed upon her the most disastrous losses from imported animal plagues, one of which—the rinderpest—robbed her of forty million dollars in deaths, alone, in 1865–6.

In America, as in England, this science is left to shift for itself. The two Canadian colleges, at Toronto and Montreal, received some slight recognition and help from the Dominion Government, but in the United States all have been started as private ventures. The first of these was chartered by the Massachusetts Legislature, under the name of the Boston Veterinary Institute, in 1855, but proved short-lived, and utilized some of its latter days by circulating a paper, offering its degrees at the modest sum of ten dollars, without putting the candidate to the trouble of attending or of submitting to an examination. This was followed by the New York College of Veterinary Surgery, which was chartered in 1857, but not really started until 1864. This was maintained for eleven years, but owing to internal troubles, in 1875, the faculty resigned in a body and inaugurated a new school, under the name of the American Veterinary College. Next, in 1866, a charter was obtained for the Pennsylvania College of Veterinary Surgeons, which, after a checkered course, has ended, like the Boston venture, in disgrace, and the sentence of its only remaining officer for selling false degrees.

Beside these, it should be noted that Cornell University and Illinois Industrial University have each a professor of veterinary science, while several of the other State agricultural colleges have courses of lectures, of from one to three months in length on the same subject. The object of these is merely to furnish the agricultural student with the information necessary to the successful care of stock, and though Cornell University has given a few degrees in veterinary medicine, there is no prospect of the institution making the appointments necessary to make this a permanent course.

In the United States we see the same results of the neglect of veterinary medicine as in England. We lose over \$500,000 in two or three months from Texas fever, \$20,000,000 in a single year from hog cholera. Our large cities teem with glandered horses. Several of our Eastern States are ravaged by imported plagues, and when a new and terribly fatal one threatens our shores, the Government, in default of veterinary knowledge, issues to its custom-house officers an order, which is scarcely better than a free invitation to the pestilence, and which gives us the painful assurance that they have no legal right to exercise that control, which their own limited information on the subject demands as an efficient safeguard.

I have thus shortly traced some prominent way-marks in the progress of veterinary medicine. What is especially interesting, is the grand advance made in the course of the last century. Prior to that time, we find the art left in the main to the artificer in iron, or the still more ignorant *leech*, the extent of whose surgery consisted in opening a vein with the fleams and bloodstick, and whose therapeutics were as injurious as absurd. To-day, the veterinary profession numbers many of the most careful ob-

servers and experimenters, the most accomplished sanitarians, and the most skillful surgeons that are to be found. One esteemed member of this body presides over the far-famed *Académie de Médecine*, at Paris, and another was appointed president of the Scientific Association of France, for the year 1876.

**Separate and Conjoined Study of the Medicine of Man and Animals.**

We have seen that in the days of Hippocrates medicine was to a large extent one, the physician (*Ταρχος*) was, in many cases, a veterinarian (*Ζωΐαρχος*) as well, and took lessons in anatomy, physiology, pathology, and therapeutics from his practice on the lower animals. For many, this catholicity of feeling and action produced a breadth of view and soundness of practice which has served to rescue their names from oblivion, and hand them down to us as the *fathers of medicine*.

In modern times, a similar course has secured most of the great advances in medicine and surgery, and physiology and therapeutics. If we open a modern work on physiology, we see that almost every step in advance has been gained from observations made on the lower animals. To illustrate this would be to furnish a large volume. Our knowledge of the functions of the nervous system, of circulation, of sanguification, of absorption, of nutrition, of secretion, &c., is almost entirely due to observations made on the lower animals. As medicine has advanced, this investigation of the lower creation has been resorted to more and more, and can be traced down from the labors of Harvey, of Haller of Legallois, of Charles Bell, of the Hunters, of Florens, and of Majedie, to the great host that are now engrossed in this profitable field of study.

If we pass to pathology, the case is nearly the same. Many of the most complex pathological processes owe the elucidation of their nature, progress, and results too observations made on animals. The phenomena of inflammation as a generic morbid process have been studied on animals in a way in which it would have been impossible to do on man, and the descriptions given of inflammation and its products, are descriptions drawn from animal pathology. Fever, too, presents facilities for study in animals, which could not be obtained in the human subject, and these have been availed of to elucidate points that would otherwise have remained in obscurity. (See as a single illustration of this the English Royal Commissioner's Third Report on the Cattle Plague.) The service rendered in regard to the other morbid processes is well illustrated by the treasures of the Hunterian museum, and by the works of pathologists from Hunter's day to this.

In surgery an analagous obligation has been incurred. Plastic operations, the methods of repair in fractures, tenotomy, hamostatics, subpurified section, and a host of other brilliant advances in modern surgery, were based upon observations made upon animals. Some, indeed, like tenotomy, were first practiced by veterinarians on domestic animals, and afterward appropriated for the relief of man.

When we enter on the list of contagious and parasitic diseases, we are at once brought face to face with a sanitary question of supreme importance alike to man and to his living possessions. Several of the specific and contagious diseases of animals are communicable to man, with a more or less deadly effect. Many, also, of the parasites of animals inhabit the human body as well, and the result of their entertainment is not unfrequently fatal to the human bearer. As both the contagious and parasitic diseases are propagated by germs produced in countless numbers in the body of the victim, it follows that the aggregation in a limited area of men and animals, in which they can live and increase enormously, enhances the danger to both kinds of victims. If physicians are left ignorant of the affection in the beast, and veterinarians of the same in man, they each miss the golden link which would reveal the true nature and dangers of the disease, and enable them to contend with it successfully.

**Specific Diseases Common to Man and Animals.**

Without entering extensively upon the subject, I will note a few of the more fatal diseases in which men and animals reciprocate:

**ASIATIC CHOLERA.**—The implication of domestic and wild animals in this disease, has been extensively observed: In India, by Annisley, Tytler, Jamison, Searle, Chalmers, Rankin, Orton, Barrand, and others, and in Europe by Jaenichen, Kleinert, Cohen, Hensinger, Carrere, Hildebrand, Hering, and Dick. Recently Thiersch, Burdon, Sanderson, Crocq, and others, have investigated the disease, producing it experimentally in a great number of mice, guinea pigs, hedgehogs, pigeons, and dogs. These experiments on the lower animals have served to clear up the nature of the disease, and to suggest a rational treatment, and, above all, a sound system of prevention which no observation of the malady in the human subject alone could have furnished. The physician who neglects such light, and confines his observations to the human patient, is an unsafe guide, whether in the sick room or as a sanitarian.

**HYDROPHOBIA—CANINE MADNESS.**—Everybody thinks he can recognize a mad dog, and many a poor brute, the victim of an epileptic fit, of a bone in the throat, or even a violent colic, has been hurried out of existence, under the conviction that he is rabid. Even among the medical profession, we find the most injurious blunders on this subject. How often do we read accounts of *hydrophobia* in man as the result of a bite from a dog which is known to be still alive and well. Two weeks ago I was asked to visit a case of this kind, in a boy of eleven years, who was suffering from paroxysms recurring every half hour or three quarters, and of whom it had been decided by physicians that he could not live over twenty-four hours more. One of the paroxysms had just terminated on my arrival, but I found no febrile temperature, no visual irregularity, and no mental susceptibility, such as characterize hydrophobia. His pulse was natural as regards number, but irregular alike in force and frequency, and altogether it was evident that he was a very nervous excitable subject, and the victim



of one of those emotional forms of disease so well illustrated by the dancing mania, &c., of the middle ages. During the next three hours, in which the boy's attention was engaged and kept from reverting to his infirmity, there was no return of the paroxysms, and after this, (ten, P. M.,) he went quietly to sleep. An enthusiastic student spent each day with the boy for a week, after which the little fellow returned to school happy and well. Many such cases might be described with a less favorable ending, and of which the brains and other structures have been subjected to microscopical examination, as illustrative of hydrophobia. Nor are mistakes on this subject confined to the rank and file of the medical profession. The learned Sir Thomas Watson, in his recent article on this malady, records his belief that "hydrophobia does not ever produce itself." This is a time-honored fallacy, but now abundantly disproved by accidental inoculations of those that attended on the victims and washed their clothing, as well as by the inoculation of animals with the saliva of rabid men. The dangers of such blunders and fallacies are too obvious to require comment.

**GLANDERS.**—Though known in Solipeds as early as the times of the ancient Greeks and Romans, this disease was only observed in man in the beginning of the present century. Then it was first recognized by Waldinger, of Vienna, and as attention was attracted to the subject, his discovery was soon amply confirmed from every side. What frightful sufferings, and horrible deaths had resulted, at all times and in every part of the civilized world, before the discovery that man owed this disease to the domestic animals, can never be revealed, but from the number of cases reported on all sides, as soon as Waldinger's discovery became generally known, a very high mortality can be safely inferred. Here again we have a terrible example of the loss sustained by the disassociation of human and veterinary medicine. The criminal negligence of our State Legislatures to enact laws forbidding the use or exposure of animals suffering from this and other fatal disorders, contagious to man, may be in part charged on the apathy of the medical profession on the subject. The natural result has followed; many of our large cities swarm with glandered horses, which are habitually sent to the country for treatment or change of air, and severe losses are entailed in many localities. What is more to our present purpose, human victims are not unknown, one such having just come under my notice, because the attending physicians honestly acknowledged that they knew little or nothing of the malady.

**TUBERCULOSIS.**—Modern research, mainly in the hands of veterinarians, has established the fact that tubercular consumption is a specific and communicable disease, conveyable from animal to animal not alone by inoculation, but by feeding upon the fresh and even the cooked products of the disease. Here again is a subject which has proved a battle-field for centuries for the medical men, has been definitely settled by a reference to comparative pathology, and by instituting a series of observations and experiments on the domestic animals. The importance of this discovery of the

communicability of tubercle to animals and man, cannot be overestimated, and speaks with trumpet-tongue of the value of comparative pathology to the physician and veterinarian.

**Parasitic Diseases in which Men and Animals Reciprocate.**

Diseases due to parasites, harbored by man and animals, are far more numerous than those dependent on specific disease poisons. We cannot here enumerate the whole, but must hastily refer to a few only of the more redoubtable.

**MALIGNANT PUSTULE, MALIGNANT ANTHRAX, ANTHRAX MYCOSIS, ANTHRAX BACILLIS.**—This is one of the most anciently known of diseases, being almost certainly that which cut off the Egyptians and their cattle in the days of Moses, and that which swept down the Greeks and their live stock at the siege of Troy. Through the middle ages its ravages were frequent and extensive, the destruction falling with equal impartiality on man and beast. In the agriculturally undeveloped steppes of eastern Europe and Asia, such wholesale destruction occurs as a matter of to-day, and in our own Southern States severe losses are often sustained. Even in the North it is far from uncommon. I have known as many as fifty perish from a single herd in two weeks. Doctor Bell records the occurrence of the disease in an equal number of human beings, within a few years, and many of them in Brooklyn City Hospital. I am further acquainted with a number of isolated attacks in man, caused by inoculation from the diseased animals. Here, again, in several cases, the attending physicians failed to recognize the disease, on account of their want of acquaintance with the pathology of animals. We now know, from investigations conducted on animals, that this affection depends on the presence in the system of a vegetable parasite, a special development of a fungus, (*Bacillus Anthracis*.) which maintains its infecting properties only at a particular stage of development, but may be preserved for an indefinite length of time in buildings, yards, fodders, soil, and grasses, as well as in the dead bodies and other products of the diseased animals.

**MILK SICKNESS.**—According to Doctor Phillips, this disease is also due to a vegetable fungus, which conveyed to man, in the products of the living or dead animals, produces a profound nervous prostration, with impairment or suspension of nearly all the vital functions, and in many cases death. As the disease is produced in man mainly by the consumption of butter and cheese, and as these products from infected localities are likely to be sent to a distance, it seems probable that cases of milk sickness occur, especially in the large cities, without any recognition of its true nature. A thorough course in comparative pathology would enable the physician to recognize these more readily, and to interdict such dangerous articles of food, through the agency of the city board of health.

**VEGETABLE PARASITES ON THE SURFACE.**—Of other vegetable parasites there need only be mentioned those productive of the different forms of ring-worm, all of which exist in the domestic animals, and those causing thrush

in the mouth of young animals. If the practitioner, medical or veterinary, is unacquainted with the habits of these parasites on animals and vegetables, he is not likely to prove a satisfactory sanitary adviser, however successful he may be in destroying the parasite in the individual case.

EUTOZOA.—Of eutozoa or worms, man reciprocates with the domestic animals in entertaining at least six different species of *tapeworms*, some of them like *echinococcus*, productive of much suffering, and a fatal result in many cases. Of one *trunatode* or *flake*, and of three *round worms*, including the deadly *trichina*.

EPITZOA.—Of animals that live on the surface, no less than a dozen species are common to man and the domestic animals, and though these are not usually dangerous to life, yet they will, in some instances, prove most inveterate and indestructible, and condemn their victim to a most miserable existence.

This hurried and imperfect notice of the maladies common to man and animals will serve to illustrate how much is lost by the separation of the two fields of medicine, human and comparative. If the above remarks have seemed to reflect unduly on the average medical practitioner, it is in no invidious spirit, but only because the object of the present paper is to show how much the medical profession may gain from a closer association with comparative pathology, and especially with veterinary medicine. Such a connection would accrue even more to the profit of the veterinarian, alike in giving him the status that he ought to possess, and in furnishing him more thoroughly for the practice of his profession. The average veterinarian is, to say the least, no better informed on many of the points referred to than is the average physician, and broader views and sounder practice will come to both from the mutual cultivation of that field which is common to both. This is already recognized in the best medical schools of Continental Europe, and by their chairs of comparative pathology, filled by accomplished veterinarians, they are seeking to reap the advantage England has recognized the same truth in associating with the Brown Institution—an endowed hospital for sick animals—a department for experimental research in comparative pathology, and a lectureship on the same subject. Oxford now follows suit in an endeavor to establish, within her academic shades, a chair of comparative pathology.

If we turn from pathology to the physiological action of medicines, the basis of all rational therapeutics, we find that here too a solid ground work is laid in a careful observation and experimentation on animals. Take up any large work on therapeutics, and you find that nearly every every drug has been thoroughly tested on the lower animals, and that its various known physiological effects have each been determined by such experiment.

Doctor Bell Pettigrew, puts the case forcibly but thoughtfully, when he says: "No one can intelligently administer medicine to a human patient who is ignorant of the effects produced by it on the lower animals. A perfectly educated physician should also be master of the veterinary art."



Another eminent medical writer remarks: "That men should confine themselves to curing what they are pleased to call the lower animals to the exclusion of mankind, and the reverse, I cannot, and never have been able to understand, and I hope the day will soon come when he who medically treats mankind, may be looked upon as a dangerous specialist, if he has not attained his position by a comprehensive study of the diseases of the lower animals. That the sister study of human medicine should recognize the advantage of a knowledge of comparative anatomy and physiology, and overlook the vast and unspeakable advantage of a knowledge of comparative pathology is really inconceivable."

The *London Medical Examiner*, in announcing a department of *comparative pathology* in its columns, makes the following very truly remarks: "As much of our exact knowledge of the phenomena of healthy life, or physiology, has been obtained by observation on the lower animals, true scientific pathology, or a knowledge of the phenomena of disease, must be based upon the study of diseases and morbid processes occurring in other animals besides man. It is a recognition of this fact that has led to the proposed establishment of a chair of general and comparative pathology at Oxford, a university which has been foremost in promoting the science of biology. There are many reasons why animal pathology and medicine should precede or accompany the study of human medicine. Living under more simple conditions—conditions more approaching those of nature—the transition from a state of health to a state of disease is more easily traced, and diseased processes are more simple in the lower animal than in man. The student of animal pathology and medicine is able to command the circumstances of disease to an extent quite unparalleled in the case of man. Both the individual and his environment are to a greater extent under the control of the observer, and by varying the condition of life he is able to modify the course of the disease. There is thus afforded to him an opportunity of calling into play of varying or of removing the conditions which appear to produce disease, and thus to determine the essential factors of morbid processes. In the human subject one of our greatest difficulties is that conditions cannot be repeated or varied at will, and thus arises the uncertainty which hedges in the study of medicine, however indefatigable and sincere may be the student. Again, in the lower animals morbid processes can be studied in all stages of their progress, for the victim of disease can at any moment be destroyed. In this way essential and early changes can be differentiated from those which are secondary and mere complications. It is the privilege of our office to prolong human life to the utmost limit, and hence we are unable to employ the scalpel and the microscope, or the test tube to the dead body, till such time as the original morbid processes have become greatly obscured, if not completely effaced. Such knowledge is necessarily one-sided; for by studies prosecuted on the dead, we are often unable to discover the subtle and delicate point on which is suspended the brain, oscillating between recovery and death. It

is in the domain of preventive medicine, however, that we have most to expect from veterinary medicines. Here the scientist is not only able to indicate the measures necessary for the suppression of disease, but can get legislative authority for enforcing them. From knowledge gained in this department, we shall be able to apply the remedies necessary for the prevention of human diseases."

"Many of the greatest achievements in physiology, pathology, and therapeutics have been gained in the sphere of the veterinary physician by students and practitioners of human medicine. The more advanced position of human medical science explained this anomaly in former times. But now veterinary medicine has emerged from the empirical to the scientific stage; and the veterinary profession will be expected to contribute more and more to the knowledge of our science and art. The training of the veterinary practitioner is daily becoming more comprehensive and more careful, and the fruits of this are seen in the rapid advances of veterinary science, and in the culture of those engaged in veterinary medicine and surgery. Veterinary literature has made enormous progress during the last few years, and the most brilliant future may be predicted for it. Now that veterinary medicine has been established on a scientific basis, the time has come when the bonds that unite the students and practitioners of human and veterinary medicine should be knit more closely, and the two branches be brought into more intimate relationship. Human and veterinary medicine are progressing along the path of knowledge, but they are separated from one another. Fellow-travelers along the steep and rugged course, they should advance hand in hand, helping each other to surmount the obstacles they will have to encounter on the way. Each has much to learn of the other. While the objective side of disease is often studied to the greatest advantage in animals, the subjective can be studied in man alone. It is, therefore, no less necessary for the veterinary physician to have a knowledge of disease in man, than it is advantageous for the practitioner of human medicine to study diseased processes in the lower animals."

This last remark is suggestive of the true remedy for the present undesirable state of things. Both branches of medicine suffer from separation. Each is necessary to the rapid progress and highest advancement of the other. The obvious necessity is, that both should be taught in the same institution. While this will secure breadth, fullness, and soundness in the instruction, it will attain still another desirable end—the teaching of both at a cheaper rate. Much of the ground gone over by the student of human medicine must also be covered by that of veterinary medicine. Many subjects may, therefore, be taught to a large mixed class of students of those two branches, thereby saving the time and expense of two teachers, while the increased numbers and greater resources will enable the institution to make this one course much more effective than any two such courses, delivered by different men, in distinct colleges, and with less perfect appliances. It is only when the medical and veterinary students enter on the

study of those subjects which are peculiar to the practice of the two branches of medicine and surgery, that they must study in distinct classes and under special teachers. The following table, of the common and distinct studies, will sufficiently illustrate these remarks:

SUBJECTS THAT CAN BE TAUGHT IN COMMON.	SUBJECTS TO BE TAUGHT SEPARATELY.		
<i>General Anatomy</i> , . . . . .	<i>Descriptive Anatomy</i> , . . .	Man.	Domestic animals.
<i>Physiology</i> : Functions of cells and nuclei, nutrition, growth, development, ab- sorption, sanguification, circulation, innervation, respiration, secretion, gen- eration, embryology, &c., .	<i>Surgical Anatomy</i> , . . . . .	Man.	Domestic animals.
<i>Hygiene</i> , . . . . .	<i>Functions of specific organs</i> , . . .	Man.	Domestic animals.
<i>General Chemistry</i> : Ana- lytical, pharmaceutical, toxicological.	<i>Hygiene</i> : Specific points in. <i>Medical Chemistry</i> : Dietetic, . . . . .	Man.	Domestic animals.
<i>Botany</i> .	Physiological, . . . . .	Man.	Domestic animals.
<i>Geology</i> : Including hygrom- etry of soils, &c.	Pathological, . . . . .	Man.	Domestic animals.
<i>Microscopic Anatomy</i> : Gen- eral, . . . . .	<i>Microscopic Anatomy</i> : Spe- cialties in, . . . . .	Man.	Domestic animals.
<i>Pathological Anatomy</i> : Gen- eral, . . . . .	<i>Pathological Anatomy</i> : Spe- cial, . . . . .	Man.	Domestic animals.
<i>Materia Medica</i> .	<i>Therapeutics</i> , . . . . .	Man.	Domestic animals.
<i>Principles of Medicine</i> , . .	<i>Toxicology</i> , . . . . .	Man.	Domestic animals.
<i>Principles of Surgery</i> , . . .	<i>Practice of Medicine</i> , . .	Man.	Domestic animals.
<i>Physical Diagnosis</i> , . . . .	<i>Operation (practice of) Sur- gery</i> , . . . . .	Man.	Domestic animals.
	<i>Specialties in Phys. Diag.</i> , .	Man.	Domestic animals.
	<i>Diagnosis of Lameness</i> , . .		Domestic animals.
	<i>Examinations as to Sound- ness</i> , . . . . .		Domestic animals.
	<i>Jurisprudence</i> , . . . . .	Man.	Domestic animals.
	<i>Principles of Breeding</i> , . .		Domestic animals.
	<i>Obstetrics</i> , . . . . .	Man.	Domestic animals.
	<i>Parasitism</i> , (could be profit- ably taught to all alike.) .	Man.	Domestic animals.
<i>Sanitary Science and State Medicine</i> , . . . . .	<i>Specialties referring to Epi- demics and Epizootics</i> , .	Man.	Domestic animals.
	<i>Protection from Exotic Plagues</i> , . . . . .		Domestic animals.
	<i>Extinction of imported and indigenous Plagues</i> , . . .		Domestic animals.
	<i>Principles of Shoeing</i> , in health and disease, . . . .		Domestic animals.

Before leaving this subject, one other remark on the words of the *Medical Examiner* is demanded. The full advantage to the medical profession from association with the veterinary, is only to be obtained by the experimental investigation of disease. In practice, the veterinarian has rarely any advantage over the physician of man, in the power of sacrificing the sick in the interests of science or of changing the environment and conditions of life. To avail of this, provision must be made for a certain expenditure for experimental purposes, and any such outlay with competent scientific supervision must prove of the greatest advantage to both physician and veterinarian.



**Advantages of the Double Qualification (Medical and Veterinary) to County Practitioners and their Patients.**

The associations of human and veterinary medicine in one educational establishment would render it easy for young men looking forward to a country practice to extend their curriculum, so as to secure degrees as "human" and "animal" physicians. The double practice would, in many cases, add largely to their emoluments as well as their usefulness; their employers would esteem them all the more highly that they could turn to them with confidence to prescribe for their valuable stock, as well as their sons and daughters, while to the physicians themselves would belong the enviable distinction of conservators of the lives and fortunes of the community. In many districts where two professional men, medical and veterinary, could scarcely subsist, one with the combined qualification would make a good livelihood. If properly educated, he would prove a sounder guardian of human health, from his acquaintance with the diseases of the dependent animals, and he would be a safer veterinary physician for his extensive acquaintance with the pathology of man. His better position and more abundant resources would enable him to keep up with the times, and to avail for his employers of the most recent advances in pathology, therapeutics and sanitative, so that the dweller in the remote country districts could have nearly all the advantages of the denizen of the city. Finally, the practitioner would have the uncommon advantage of a most extended field to observation, and not only would he be enabled to add many new facts to pathology, but he might gain a breadth and soundness of erudition, that would, in some cases, especially fit him to be a teacher of the science.

In advancing such a proposition as the above, I by no means advocate that the simple physician should encroach on the sphere of the veterinarian, or the veterinarian on that of the physician. It is a matter of common observation with veterinarians, that when a physician prescribes for his own horse, he is as likely as not to blister the shoulder for a lameness due to disease in the foot, or to give a few grains of tartar emetic, which would be entirely inoperative on the equine system. So with the veterinarian, in prescribing for his own family, he is stepping out of his sphere, and is likely to act detrimentally, rather than beneficially. For this new field, I propose a new style of practitioner, more comprehensively educated and equipped, than either physician or veterinarian—one who has given a longer time to acquire his education, who has earned both degrees by faithful and conscientious study, and who, in the hospitals for men and animals, has made himself thoroughly acquainted with the diagnosis and treatment of the maladies of man and beast. In many sparsely populated districts, a practitioner of this kind would be a most desirable acquisition. While in the cities and densely peopled localities, specialists must continue to pursue human and veterinary medicine, surgery, ophthalmology, otology, gynecology, dentistry, &c., &c.

*Veterinary Practitioners Needed in the United States.*

There is no means of ascertaining the number of educated veterinarians in the United States, but it may safely be affirmed, that nearly all such are confined to the large cities. In the country districts, where the greatest and the most valuable part of our live stock is to be found, they are few and far between. In the absence of these data, we may estimate the number of live stock of our own and other countries, and deduce from this the requisite number of veterinarians. Great Britain, which stands low in the European scale, as regards veterinarians, owns over forty-two millions head of live stock; and not much less than two thousand veterinarians. If, however, we cut off sheep and swine, for which the English veterinarian does little or nothing, we find but three millions nine hundred thousand head of horses and cattle, or more than four thousand for every veterinarian in the country. The ratio adopted in the cavalry, of one veterinarian for each regiment of one thousand, would necessitate a four-fold increase of the profession.

Turning to the United States, we find over one hundred million head of live stock, or if we cut off sheep and pigs, we have still left over thirty-nine millions horses and cattle, very nearly five times the number found in Great Britain. If therefore Great Britain requires two thousand veterinarians, we require no less than eight thousand, or if we were to estimate accordingly to the number supplied to the British army, we would swell the number to thirty-nine thousand.

The following tabular arrangement will present very forcibly the needs of the United States, as compared with Great Britain:

	<i>United States.</i>	<i>Great Britain.</i>
Horses, asses, and mules, . . . . .	11,149,800	2,790,851
Cattle, . . . . .	27,870,700	6,115,491
Total horses and cattle, . . . . .	39,019,500	8,906,342
Sheep, . . . . .	35,935,300	31,313,941
Swine, . . . . .	25,726,800	2,422,830
Total live stock, (except carnivora,) . . .	100,681,600	42,643,113
Veterinarians, actual, (probably,) . . . . .	200	2,000
Veterinarians needed in ratio with live stock,	4,762	
Veterinarians needed in ratio with British Cavalry, . . . . .	39,019	

It is perhaps an extravagant estimate to set our needs down at four thousand seven hundred and sixty-two, or one veterinarian to every twenty thousand head of live stock, though if these could be collected within a reasonable area, we would find more than enough to do in attending to their health. The objection is not the want of practice, but the fact that in many places the stock is scattered over such a wide district, that it would not pay the veterinarian to visit them at rates, which the interests

of the stock-owner could allow. If, however, we could furnish such districts with practitioners, having the double qualifications, they could find within a reasonable area a sufficient number of patients to make it worth their while to stay, and worth the people's while to employ them. One such practitioner to every two hundred square miles is surely a very modest estimate, and this would give us considerably over five thousand in the States of the Atlantic slope.

#### Value of Veterinarians to the Country.

The value of the present services of veterinarians in the United States must be a very meager sum comparatively to what it might be if veterinary science were availed of as it ought. Some estimate of the value of a scientific veterinary supervision, may be deduced from the fact that prior to 1836, the losses in the French cavalry amounted one hundred and ninety per one one thousand per annum, but the veterinary care has reduced this of late years to sixty seven per one thousand yearly. In the English cavalry the record is far better, and largely because a superior stable accommodation has been secured. Colonel Sir F. Fitzwygram, himself a veterinarian, in a recent lecture, gave it as the result of his experience, that veterinary sanitary science had reduced the loss of horses in the English cavalry regiments to a minimum, and the annual "casting" of horses to ten per cent.; giving an average service of ten years to each horse carrying two hundred and fifty pounds on its back, at a rapid pace, over rough ground. The same authority recently mentioned an instance in which the supervision of a veterinarian led to a yearly saving of \$30,000 in a shed of four hundred hard working horses. An instance almost as striking occurred in the practice of a friend of the present writer, in charge of the horses of a large colliery company in Durham, England.

But it is in the department of *sanitary or preventive medicine* that the value of the work of the veterinarian is the highest. Ordinary diseases of animals carry off isolated individuals only, and the full measure of the loss is in every case seen and appreciated at once. One case of sickness or death brings no danger to the other stock, and the owner can, in any case, estimate whether he can better afford to lose his property, than to incur expenses for medical treatment. But with animal plagues, the first case of illness is pregnant with a mighty and ever increasing danger, not only to the other stock of the same owner, but to all the live stock of the nation, and even in some cases to the citizens as well. Taught by the bitter experience of many centuries, the separate nations of Europe now avail of veterinary science to save them from yearly losses of millions of dollars by animal contagia. A country like England, which has been beguiled into a false sense of security, by its comparative isolation, and that has failed to avail of this modern science, has been drained of \$40,000,000 in one and a half years by one plague, and of a regular tax of upwards of \$15,000,000 per annum by another.



Coming to our own land, we find a loss by one plague of swine in a single year, (1876,) of no less than \$20,000,000. It is the province of veterinary science, acting with government authority, to attempt the extinction of this plague, and there can be little doubt that at a small expense comparatively, this malady may be crushed in the bud in whatever locality it may show itself. Beside our other indigenous plagues and parasitic diseases in domestic animals, we are continually threatened with foreign animal contagia against which we have no reasonable protection. The present Treasury orders on this subject, admit all "*blooded*" animals on the strength of a consular certificate of soundness, which is only equivalent to a free invitation to animal diseases in general. The only safe position to occupy in this matter is that of a careful examination of every imported animal by a veterinarian, of a quarantine under veterinary supervision, and of such a duration as will exclude the possibility of the dreaded disease being harbored by the subject, of a thorough disinfection of the surface of the imported beast, and of all articles used about it, and finally of the systematic destruction of all fodder and litter imported with such animal. The limited character of our importations of live stock, would allow of such restrictions without any perceptible injury to commerce, or to our national prosperity, and the ever threatening dangers against which they would secure us, are in their nature almost illimitable as to extent and duration. The most insidious, and therefore the most dangerous of all cattle diseases, (*lung fever*.) we now harbor in our midst, and while it makes slow progress owing to the opposing current of cattle traffic from the west, and the want of temptation to transport our common eastern cows into the cheaper western herds, yet it is steadily encroaching on new territory, and now numbers its victims among several high class herds. Any day a bull from one of these thoroughbred herds may be sent west for the improvement of the native stock, and may thereby introduce this disease into our unfenced stock ranges when it will be practically impossible to eradicate it. The same malady imported into the open stock runs of the Cape of Good Hope and Australia, swept the herds off in a rapid destruction, and successfully resisted all efforts to extinguish it. The same holds good with this and other plagues on the open steppes of eastern Europe and central Asia. There, animal plagues in general find a perennial home. From these the best directed efforts of a thoroughly equipped sanitary commission have failed to eradicate them, and against these Eastern plagues the adjacent European nations can only protect themselves by a most elaborate and expensive system of frontier inspection and quarantine, which is paralyzed on the occasion of every great war, and occasionally even circumvented by smuggling and corruption, with the most disastrous effects to the western countries.

Our cattle traffic from the West and South is so extensive that any efficient system of examination and quarantine, sufficiently extended to exclude this disease, would be impracticable, as the trade would be thereby completely suspended. Since, therefore, the trade must go on, the inevit-

able result of the infection of our western stock-runs will be the infection of our eastern States throughout, and a yearly loss which can easily be estimated by the corresponding loss in Great Britain, from the same disease, since its importation, in 1842. Since that time Great Britain has lost in deaths alone, from this malady, on an average, \$15,000,000 per annum. This, it will be remembered, is on a stock of six million head, from which fall to be deducted the great herds of black cattle bred in the highlands of Scotland, which have hitherto escaped infection, owing to the absence of the importation of strange beasts into their midst. Taking the same ratio, without this deduction, for our twenty-eight million head of cattle, our general infection would lay us under tribute to the extent of \$60,000,000 per annum. Or if our herds increase at their present rate, our losses, by the end of the century, would amount to a yearly total of at least \$120,000,000.

This it is the province of veterinary science to save to the country, by crushing out this most insidious and fatal malady, while it is still confined to the enclosed farms of our eastern States. At present this can easily be accomplished by sound and rigidly enforced veterinary sanitary laws. If the United States decline to avail of these, the sad truth of the above mentioned representations will burst upon them with overwhelming force on some, perhaps, not distant day, and they will vainly turn for help to the long neglected science of veterinary medicine, at a time when it can no longer offer a perfect protection.

We have just had an instructive instance of the disastrous results of neglecting the warnings of science in the case of the invasion of the *potato beetle*. Professor Riley warned the nation of the great losses that would result from its eastward progress, and showed how, by the outlay of a few thousands, it might be prevented from crossing the Mississippi. Instead of heeding his advice, the Missouri government, in a fit of blind retrenchment, abolished his office of State Entomologist, thereby effecting an immediate saving of \$3,000 a year, while the *potato beetles*, allowed to cross the river, at five separate points only, have laid the eastern States under a contribution estimated at \$100,000,000 per annum.

Even more disastrous would be the acclimatization of the *lung fever* in the western States and Territories. Hence the urgent necessity that the country should foster veterinary sanitary science, and avail of it to obviate such a catastrophe. So, too, with regard to other animal plagues, indigeneous and foreign. But to accomplish this in the best and cheapest manner, in a thinly peopled country like the United States, we must have the new style of practitioner, of human and veterinary medicine, and hence the surpassing importance of medical schools in which both will be taught in the most thorough manner. It speaks well for the advanced and far seeing views of the faculty of the University of Pennsylvania, that they are the first among American institutions of learning to have recognized the importance of this alliance between the two sister professions of medicine, and it is to be hoped that the Legislature will prove themselves equally

liberal and true to the best interests of the country in providing the means for a firm and permanent consummation of the union.

JAMES LAW, F. R. C. V. S.,

*Professor of Veterinary Science, Cornell University.*

Doctor Dickie, of Doylestown, Pa., kindly consented to write the following paper which sets forth the necessity of scientific investigation of the diseases of our poultry.

#### **Our Poultry Interests.**

Poultry keeping, as a source of food supply, is insensibly but surely taking rank among the productive industries of our country. In popular estimation, poultry and egg production are looked upon as a quite subsidiary interest, confined almost exclusively to the women folk and children of the farmer's household. Such a view might have been approximately correct twenty years ago, as it was of cheese making, but it is not so at present. Poultry production and cheese production have both become skilled industries. Many people are surprised at the rapid growth in the production of cheese as an article of commerce. We know something about the cheese trade, because cheese is an article of export and figures in the reports of boards of trade and the produce exchange. But the poultry and egg trade has not got that far yet, and the public has no means of knowing anything about the extent and value of these products. Only those who know something of the ins and outs of the poultry and egg business can form anything approximating a correct estimate of its amount and value. One is perfectly safe, however, in saying that, like the cheese industry, the poultry industry of the nation is no longer confined to the hands of the dairy-maids and children.

In all the eastern and middle States poultry keeping is largely pursued, while the industry is rapidly growing in the west and south. Those whose business interests familiarize them with the condition and extent of the poultry and egg trade understand and appreciate its importance, while the masses who consume the products of our poultry yards have no idea of it whatever.

Poultry keeping is quite a domestic industry, and is susceptible of general diffusion. It is not confined to the farm at all, but on the contrary, the dwellers in villages and towns now furnish more poultry and eggs to our markets than were supplied by our whole farming population a quarter of a century ago. In the eastern and middle States every body keeps poultry who has room enough for it. The business is capable of almost unlimited extension, because, on a small scale, but little capital is required, and the expense of keeping the fowls is not great, while the profit is worth looking after, and in the rural villages and districts is a great help towards supporting a laborer or mechanic. Fresh eggs are always exchangeable at the country or village store for groceries and dry goods, and millions of dozens of them are thus disposed of by their producers every year, while



at almost every railroad station east of the Mississippi and north of the Ohio rivers, dealers are found who will pay cash for good poultry, dead or alive.

While, therefore, it may readily be shown that the poultry interests of the nation, domestic and apparently insignificant as they may appear, are yet quite important, and are destined to advance with our civilization and our facilities for more extended and intimate commercial relations with Europe. We hear much about the shipments of fresh beef to Europe, and of the stimulating effect it has, or will have, upon cattle raising; but we hear nothing, as yet, about the shipments of dressed poultry, which are quietly going on, with fair prospects of being largely increased within the next few years. As soon as the poultry keepers of the Delaware valley have a surplus, they will find an outlet for many tons of poultry, particularly turkeys and capons, by way of the American steamship line, from Philadelphia.

The main drawback to a largely increased poultry production is presented in the diseases and ailments which attack the stock. Thousands of those engaged in poultry keeping seem to know little or nothing about the requirements of the business, in respect to proper management and wholesome sanitary regulations. An inevitable result of this ignorance and mismanagement is seen in the prevalence of diseases in the poultry yard. Many millions of dollars worth of poultry are annually lost from this cause. It would probably be within the limits of the truth to say that one half of all the chicks hatched in the country are every year carried off by some of the ailments and diseases which are so prevalent. This is a frightful statement, but it is not an exaggeration. The public needs authoritative instruction in proper methods of poultry management; but, unfortunately, scientific men either have not the time or lack the inclination to investigate the diseases of domestic fowls. Poultry keepers themselves are incompetent to do it; the masses of them are not educated people, and have but vague ideas of scientific methods or therapeutic applications. Assistance then must come from a different quarter, and science must be invoked\*to assist the poultry keeper.

The prevailing ailments and diseases attacking poultry may be summed up under the following heads:

- I. *Parasites*.—Lice and gapes.
- II. *Catarrhal affections*.—Roup in all its various phases.
- III. *Diphtherite*.—A disease affecting the mouth and throat, giving rise to an exudation on the surface of the mucous membrane.
- IV. *Septicæmia*.—"Chicken disease," poultry cholera, attacks gallinæ indiscriminately; but does not effect water-fowl.
- V. *Affections of the alimentary canal*.—Dysentery, diarrhœa, indigestion, "crop bound," canker, &c.
- VI. *Affections of the nervous system*.—Leg-weakness, staggers, vertigo, apoplexy, &c.

VII. *Erythematata*.—Yaws and other ailments independent of roup, which are characterized by eruptions on the surface of the head and its appendages.

VIII. *Traumatic troubles*.—Wounds, broken bones, frost bite, &c.

IX. *Vices*.—Feather plucking and eating, egg eating, &c.

This may not be a full classification, but it embraces all the more common disorders, the most important of which are *gapes*, *roup*, and *cholera*. If poultry keepers knew how to control these, the others would be of little account, except perhaps, the disease designated as diphtherite.

These diseases, strangely enough, seem to be limited to some extent in their geographical distribution by degrees of latitude. For instance, *gapes*, which are so troublesome in what may be called the middle latitudes, say, from  $36^{\circ}$  to  $42^{\circ}$  north, are much less prevalent in sections, either north or south of this belt. Roup, in some of its forms, prevails largely anywhere north of  $40^{\circ}$ , while south of the thirty-eighth parallel, it is seldom troublesome. South of  $40^{\circ}$ , however, the septic diseases, as *cholera*, and the exanthematous, as *yaws*, are especially prevalent, while both *cholera* and *yaws* are unknown north of  $42^{\circ}$ .

Being somewhat interested in poultry matters, I have, at leisure times, given some attention to the ailments affecting fowls, and believe them to be susceptible of investigation and control. All that is needed, is that the attention of men capable, through their scientific attainments, to investigate these hindrances, should do so, and, *ex cathedra*, teach the masses how to manage their poultry, by enlightened and scientific methods.

It is the province of veterinary science to undertake this task. Poultry ailments are as proper a field for scientific investigation as are the diseases of the more pretentious occupants of the stall and the sty.

The live stock interests of the United States are of extreme importance. The aggregate money value of our live stock is so great as to bewilder the man who tries to appreciate its amount. It is an easy matter to pronounce the words: "One million dollars," "one hundred million dollars," "a thousand million dollars," &c., but how many of us appreciate what an immense sum even the smallest of these expressions represents? And yet the largest of them does not represent the money value of the live stock of the country, without counting the poultry, which, of itself, aggregates an annual value of more than two hundred million dollars.

All our live stock are subject to ailments and diseases of various kinds, and many millions of dollars are lost every year for want of proper necessary veterinary treatment. This a sufficient plea for the establishment and maintenance of a first-class veterinary college, or several of them, in the United States. Our universities should teach veterinary science thoroughly, and to this end a veterinary department should be established in each of them, where regular and thorough courses in veterinary science should be provided.

The importance of the interests centered in live stock of various kinds

will, sooner or later, make itself felt, and, in time, veterinary science will rank with us as it ranks in European countries—as coördinate in importance and value with medical science. There are many men who would eagerly enter upon a veterinary course, if the opportunity afforded, and no man can estimate the advantages that would arise from the yearly graduation of a competent class of veterinary surgeons. There is a demand now in the United States for twenty thousand such men, and the institution that first establishes a thorough veterinary department will meet with cordial support.

A. M. DICKIE, M. D.

DOYLESTOWN, PA., *January 21, 1878.*

If it were necessary to re-inforce the arguments of Professor Law and Doctor Dickie, we have the authority of the distinguished George Fleming, who says, in his "Comparative Anatomy of Domestic Animals:" "I have for a long time believed that the two branches of medicine, human and animal, should be more closely allied than they are at present, and that this alliance can only be effected by a mutual study and recognition of the facts which prove that the two are really one, wide apart though they have been kept in this country, and that each is capable of conferring on the other great and lasting benefits."

Chanveau complains of the disregard, by medical schools, of comparative anatomy, saying that in them "anatomy has remained essentially minographic and purely surgical, and many medical men give us no credit for our efforts in bringing anatomy into philosophical courses." The homeopaths have a well digested system for the treatment of the diseases of animals, and some eminent works have been written by veterinarians practicing that system. Without any discussion of the truth of Hahnemann's theory, it is a fact that a large and intelligent class of persons prefer this system of practice, and there can be no doubt that it is as well adapted to the diseases of animals as to those of the human family. There are some homeopathic veterinarians practicing in Philadelphia and New York, and I am assured that the Homeopathic College in Philadelphia will add a veterinary department as soon as possible.

NOTE.—For an exhaustive "history and progress of veterinary medicine in the United States," see the address of Professor Liutard, published with other able papers, in the American Veterinary Review, vol. 1, No. 1. This capital periodical is issued in accordance with a resolution passed at the meeting of the United States Veterinary Medical Association, of which Doctor Lyman, of Springfield, Massachusetts, is president.

The board of trustees of the University of Pennsylvania have passed a resolution for the establishment of a veterinary department, as soon as a suitable endowment can be raised. At least \$100,000 are required for this purpose, partly for providing salaries, and partly for putting up the necessary buildings. When the immense interests at stake, to which attention has been called, are considered, it is evident that there is scarcely



a channel in which such a sum can be more profitably directed, than in providing means for the thorough instruction of men having suitable preliminary education, in veterinary science, so as to secure a corps of gentlemen competent to look after the hygiene and diseases of our domestic animals, now either without treatment or, at the best, at the mercy of uneducated men calling themselves veterinary surgeons. The fact that the trustees of the University are willing to assume the care of such a trust, is a guarantee that it will be administered in the manner best calculated to attain the desired results, and secure it against the possibility of the veterinary school degenerating into a second-rate affair. It is hoped that their appeal for funds will meet with the response that the importance and urgency of the object to which they are to be appropriated demand. Contributions may be sent to Cadwalader Biddle, Esquire, Treasurer of the Board of Trustees, 208 South Fourth street, Philadelphia. Legacies and bequests should be made in the name of "the Board of Trustees of the University of Pennsylvania, for the endowment of a veterinary department."

As in Philadelphia the first school of medicine on the continent was established, in 1764, and as the charter for the first veterinary college was granted by Pennsylvania, in 1853, so it is eminently proper that this should be the city which first should take the step of combining a veterinary department with its medical schools. This combination of the teaching of human and animal medicine in the same college, has received the unqualified commendation of distinguished medical men, in fact, of all the gentlemen I have consulted on the subject, with a few trifling exceptions.

NOTE.—Besides Professor Law and Doctor Dickie, I am indebted to Doctor C. B. Michener, (Veterinary Surgeon Pennsylvania State Board of Agriculture,) Carversville, Bucks county, Pennsylvania, for information embodied in this paper.

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## EPIZOOTIC PLEURO-PNEUMONIA.

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By CHARLES B. MICHENER, *Veterinary Surgeon of Pennsylvania State Board of Agriculture.*

GENTLEMEN: The only excuse I have to offer for selecting epizootic pleuro-pneumonia from the long list of zymotic diseases, as the subject of this present essay must be found in the fact that this malady has existed more extensively and caused greater destruction to our herds than almost any other. Added to this, its *long incubative stage* renders us particularly

liable to be visited by fresh outbreaks at each importation from infected countries.

#### Synonyms.

Pleuro-pneumonia epizootica has various names applied to it throughout the different parts of the United States. Among the most prominent are: Lung plague, cattle disease, lung complaint, pulmonary murrain, and lung fever.

#### Nature.

It is a highly infectious disease, peculiar to the ox tribe, and shows no preference whatever for age, condition or breed of cattle; nor for season, climate or nature of soil. It is generally considered a malignant fever, having local manifestations, which are: Extensive exudations of an inflammatory character, confined to the lungs and organs contained within the thorax.

#### Period of Incubation.

Like other zymotic diseases, there is in this an incubative stage, which varies from two to six weeks. As a rule the local manifestations appear at about the fortieth day. Some have asserted that six months may elapse before the disease is developed.

#### Detection.

In order to detect the affection during its incubative stage it is necessary for one to be entirely acquainted with the habits of healthy animals, to be a close and careful observer, and besides this to possess a thorough knowledge of auscultation, viz: A careful study and comparison of the various sounds that are manifest during respiration, both in health and disease. By the aid of the thermometer an elevation of temperature is invariably found to precede the attack for some days. This instrument is of paramount importance in all contagious diseases of cattle, as it enables the attending veterinarian to single out those undergoing an incubative stage, and thus limit the spread of contagion. No examination of suspected animals can be perfect without the aid of the thermometer.

#### History.

So far as can be ascertained, pleuro-pneumonia has its spontaneous origin in Holland, in Europe, and from there in 1714 it was introduced into England. In 1747, the disease was carried from Holland, through Bordeaux, to the south of France. We hear of it in this country as early as 1843. In 1847, the lung plague broke out in the herd of Thomas Richardson, of New Jersey. He first discovered it among his imported stock, and before other herds were exposed, knowing the malignant type of the disease, he immediately killed his whole stock, valued at ten thousand dollars, a most noble act. In the summer of 1853, (six years before it appeared in Massachusetts,) J. L. Jacobus bought twenty cattle in New York, which he turned into pasture three miles from Chatham, New Jersey. In about three weeks after, in going to look after them, two had died and three more were sick. The remaining fifteen did not develop the disease, but during

the same fall Doctor Mum, of Chatham, bought three head from this apparently healthy lot of cattle, yarding them with his other stock; not long after which, however, the disease made its appearance among some of his other cows, four of which soon died; several others took the disease but recovered. From Doctor Mum's herd it was communicated to that of Mr. Lunn, by driving a cow there where she remained for a short time. Abraham Johnson, living within a mile of Newark, New Jersey, also bought some cattle in New York, which developed the disease in about six weeks after he brought them to his farm. It was on this farm, in 1860, that we have an account of the first scientific post-mortem examination, held in this country, conducted by C. C. Gryee, V. S., in presence of Doctors G. A. Quimby and Woodruff, of Morristown, and Doctors Ward and Peck, of Newark, Governor Olden and several others.

Doctor Jennings says that it made its advent into Gloucester and Camden counties, New Jersey, in 1859, at about the same time that it did in Massachusetts. In 1860, it prevailed in Philadelphia, and spread rapidly in all directions, particularly in the southern part of the county, known as the neck. At Riverton, in 1860, Doctor Jennings held a post mortem examination in the presence of C. Wood, V. S., of Boston, and A. S. Copeman, V. S., of Utica, N. Y. The latter gentleman was one of a committee appointed by the New York Agricultural Society, for the purpose of investigating the disease. Both of these gentlemen had witnessed the disease in all its forms as it appeared in Massachusetts. They were the first to identify the complaint in the vicinity of Philadelphia, as the same epizootic pleuropneumonia, then existing in Massachusetts. In the spring of 1861, J. E. Hancock, of Burlington, N. J., bought some cattle in Philadelphia, which introduced the disease into his herd, and from which it spread to W. Hancock's, A. Gaskill's, T. Lippincott's, Widow Lippincott's, Mr. Cleninger's, and Mr. Smith's. From Philadelphia, it worked its way up the Schuylkill into Montgomery county. In the fall of 1865, some cattle purchased in Philadelphia, were brought into the vicinity of Newtown, Bucks county, and infected a herd there. One out of that number was brought to Carversville, and broke out with the disease badly, but finally recovered, and, being early isolated, did not spread the disease to any others. In the summer of 1867, pleuro-pneumonia was introduced pretty extensively into the following townships of Bucks county, viz: Buckingham, Solebury, Plumstead, Tinicum, Bedminster, Doylestown, New Britain, Newtown, Morrisville borough, Falls, Bristol, Middletown, Upper and Lower Makefield, Wrightstown, Northampton, and others. We have an account of the *direct importation* of this disease in that of Mr. Chenery, of Belmont, Mass., who imported some cattle on the 23d of May, 1859, from Holland. One of these cows died of pleuro-pneumonia on the 31st of May, eight days after landing. On the 2d of June, a second died; and on the 31st of June, a third died. In June, 1859, Mr. Chenery sold three grade Dutch calves to C. Stoddard, of North Brookfield, one of which showed symptoms



of the disease before he got them home. In November, of the same year, C. Stoddard sold eleven of his herd in different directions, which spread the contagion with fearful rapidity wherever they went. The remainder of his cattle he distributed among his friends, not knowing the nature and infectious character of the disease, and without a *single failure* the malady followed them. In one instance more than *two hundred* cattle became infected by *one* which was sold at this sale. From this starting point the disease spread to Vermont, New Hampshire, New York, Ohio, and Michigan. Epizootic pleuro-pneumonia was introduced in South Africa, about 1854, by the importation of a bull from Holland.

*Etiology.*—Before going on to enumerate the causes of this disease, I wish to fully establish the fact in your minds that there are *two distinct forms of pleuro-pneumonia* namely: *Simple or Sporadic pleuro-pneumonia* which has been known in the United States, and every where else, from the time that the diseases of cattle were first made a study: and the *epizootic pleuro-pneumonia* which made its first appearance on this continent in 1843. The symptoms and nature of these two forms of pleuro-pneumonia are so widely different, that there is no excuse whatever for the veterinarian who confounds them. Sporadic pleuro-pneumonia is caused by those agencies which usually give rise to pulmonary affections, such as—climate, temperature, exposure, ill ventilation, bad drainage, bad management, like driving cattle until heated, then standing in a current of air, or drinking large quantities of cold water, &c., &c. But that form of the disease now most particularly under consideration *never has nor never can* originate from the causes above given. It has its origin solely from a *specific* poison, which is developed spontaneously, as far as we know, only in Holland and the interior of Europe, and is carried to all other countries by infection. This poison, whatever its nature may be, will, under all circumstances, where it finds a subject susceptible to its influence, produce the same specific, epizootic pleuro-pneumonia. This virus is propagated and conveyed to others through the vitiated atmosphere which diseased cattle have been breathing by the diseased products of the body, and by the hay or litter, &c., which have been used about the sick animal.

#### Symptoms.

During the period of incubation or hatching, the animal improves in condition, and the flow of milk is increased. This is due no doubt to the influence of the poison upon the blood and nerve centers. The first stage of the disease is marked by an elevation of temperature, often registering as high as 103 to 104 degrees, Fahrenheit. In the morning the animal will be seen standing by itself, refusing to eat, back arched, respiration disturbed, and some abnormal sounds heard in the bronchial tubes; pulse rapid; shivering, dry, husky cough; mouth hot, muzzle dry. Some show a disposition to eat, and appear better about the middle of the day, but this is by no means a constant symptom.

#### Second Stage.

All the foregoing symptoms aggravated—milk decreased, mouth hot, breath tainted, mucous membranes injected, bowels constipated, urine scanty, surface of body and legs cold, shivering fits, respiration more hurried and painful, coat stares, skin dry and scurvy: the pulse is rapid and full, numbering eighty to ninety beats per minute; the head and neck are extended, and a low grunt or moan follows every expiration.

#### Third Stage.

In this stage the cough is more frequent, hard and persistent; the limpid discharge from eyes and nostrils becomes purulent, bowels still constipated, skin is bound tight to the tissues beneath, pressure behind the elbows and on the back causes great pain, and a low moan is uttered, large amount of saliva or froth escapes from the mouth; the pulse is now weak, irregular or intermittent, diarrhoea sometimes sets in, membranes become pallid, eyes sunken, animal heat exceedingly low; these typhoid symptoms are the indications of a rapid death.

#### Physical Symptoms.

By placing your ear at the bottom of the neck a loud, rushing sound of air is heard in the trachæ and bronchial tubes. The same sounds are heard at the top and sides of the chest, just behind the shoulder blade. Below and back of these parts no sound at all is heard, showing that the lungs are consolidated by the fibrous exudations which are being constantly thrown out. At the commencement of an attack we can often notice what is called the "friction sound," from the rubbing together of the thickened and rough membranes during respiration. Should one lung only be affected, the respiratory murmur in the healthy lung is much increased, in consequence of its having to perform double duty. When both lungs are diseased we expect peculiar effects and sounds, according to the intensity and extent of the lesions. There is increased resonance on percussing the healthy lung, while over the diseased part a dull, heavy sound is elicited.

#### Mortality.

Writers differ very much about the percentage of deaths from pleuropneumonia epizootica. According to M. Lecog, of France, only seventeen per cent. die. The testimony given by Dr. Martin, before the Massachusetts Legislature, fixed the per cent. of deaths at about twenty-eight, while the loss in Bucks county amounted to near forty per cent.

#### Post-mortem Appearances.

On exposing the thoracic viscera, one of the first indications of epizootic pleuro-pneumonia is the escape of large quantities of fluid from the cavity. This fluid mostly contains large patches of yellow, plastic or coagulable lymph floating about in it. As a result of the inflammation which has been going on, we find that this plastic lymph has fastened the lungs to the ribs and formed what we know as "false membranes," or "adventitious tissue."

These false membranes are sometimes fastened to the diaphragm and heart as well as the sides of the chest. The lungs are found to be exceedingly heavy, often weighing from fifty to seventy-five, and even one hundred pounds, sink in water, and instead of the bright salmon color of health, we observe a dirty gray color, mottled, and having the appearance of marble. The surfaces are rough and thickened, and the lung substance hard and firm. The bronchial tubes are frequently found entirely blocked up with fibrinous deposits, thus shutting off the contact of air with the blood, and producing death by suffocation.

This exclusion of the atmospheric air, from the lungs, accounts for the dark purplish color of the transuded blood corpuscles, and fibrinous exudations. In some of the more advanced cases abscesses are found in the substance of the lungs, which either discharge through the bronchial tubes, undergo degeneration (the *amyloid* most frequently,) or else the discharge takes place within the chest, which gives rise to the *amphoric rale*. All the other organs of the body are (as a rule) found to be in a state of health.

#### Treatment.

There can be no special remedies given with which to treat this disease. The condition of the animal, and other indications for treatment, will be sufficient to point out to the educated veterinarian the best means to apply to each particular case. Medical treatment is, however, often very unsatisfactory, doing little or no good. By the free use of mineral tonics much good may be accomplished in the way of fortifying the system against infection. But these even can only be intelligently and safely administered by a veterinary surgeon.

#### Inoculation

This has been practiced with questionable success. The method usually pursued is either to inject some of the serous fluid obtained from the lung, or to tie a piece of the deceased lung on the tail, after having made an incision through the skin. Resulting from this operation we frequently see the animals lose their tails by gangrene. Large swellings which open and discharge fetid matter, appear on the body, and not unfrequently the animals die from the injurious effects of inoculation. It is estimated that from ten to twenty per cent. of the animals inoculated die of pleuro-pneumonia, while from one to two per cent. die from the evil consequences following the operation.

#### Terminations.

Epizootic pleuro-pneumonia terminates first in resolution. In this, the normal functions of the lungs are restored, the products of the inflammatory action are absorbed, the air cells and bronchial tubes are freed of their obstructions, the pulse becomes stronger and less frequent, respiration regular and slower, and the respiratory murmur of health is again heard. The appetite improves; more copious secretion of milk; discharge from nose and eyes ceases, the mouth is cool, and muzzle moist. Health



seems to be reëstablished. I say *seems* to be restored; for in almost every case of this kind we find, on a careful examination, more or less diseased condition of the lungs, which is present in a latent form, but only awaits the *proper stimulus* to make it the nucleus of a contagion which may infect whole neighborhoods, and bring about all the terrible calamities resultant on such outbreaks. Such cattle should therefore be fattened and disposed of to the butcher as soon as possible, and in no instance should they be allowed to herd with other cattle.

Very often an opposite termination is reached. By careful listening, with the ear applied to the sides of the chest, we detect water in the thoracic cavity, (hydrothorax.) The pulse is now weak and intermitting, and the obstruction to the circulation is evident in the production of the venous pulse. The mucous membranes are pale, and dropsical swellings appear on the chest and abdomen. The breathing is difficult, nostrils very widely dilated, and general weakness supervenes. The animal dies finally from internal drowning. Death is frequently hurried by sudden distentions of the rumen with gas, as a result of the arrest of digestion. Again we find it terminating in a slow, typhoid, hectic fever, in which obstinate diarrhœas ensue, and death follows from actual consumption.

#### Means of Prevention.

Legislation in reference to cattle diseases, with the assistance of veterinary science, is calculated to do a vast amount of good to our country. The first step to be taken in preventing the spread of this disease, is to have all the stock which have been exposed to the influence of this poison entirely isolated from all other cattle. Do not allow the person who has charge of the infected stock to handle or be about others. Keep the buckets, &c., separate, and do not, under any circumstances, feed the hay to well animals which has been refused and breathed on by the sick. Have the barn which is occupied by the sick animals thoroughly ventilated: keep their stalls clean, and use disinfectants and deodorizers freely about the floors and mangers. Cattle once infected should not be kept for any purpose, but should remain apart from all others until fat enough to kill, and be disposed of in this manner. The whole history of epizootic pleuro-pneumonia, as it has appeared in this country, clearly indicates that it is an infectious disease, and also shows, that by strict and early isolation, an outbreak of it can be stamped out almost as quickly as it was known to appear. Let us remember, in dealing with contagious cattle diseases, that the acme to be attained is efficient prophylaxis, rather than treatment. Professor D. McEachran, the very able principal of the Montreal Veterinary College, says: "When we consider the enormous wealth represented by live stock in the United States and Canada, (in the former, 100,322,600 animals, which, at a moderate valuation, amount to the vast sum of \$1,647,719,138; in the latter, 7,982,355 equal to \$133,866,567.) we will be able, in some measure, to comprehend the great responsibility resting on governments of these countries. Now that we are so remarkably free from

these contagious diseases, let us take active measures to prevent their introduction into our midst. I am convinced that we have it in our power to prevent their introduction—not by stopping importation, nor by any oppressive measures, calculated to interfere with our commercial intercourse with infected countries: but by a judicious, yet thorough, system of quarantine and disinfection at our ports of entry, and with the aid of government, and the coöperation of the people. I have no doubt but a judicious system, which will serve to protect the property of the people, without interfering with our foreign relations, or the liberty of the individual, can be organized and maintained at very little cost to the State, or inconvenience to the public. I will take the liberty of suggesting, that the ports of entry for cattle from transatlantic countries be limited to a small number, and that at each of these a quarantine be established, where cattle, sheep, and swine must be landed, and kept for a period, say of eight or ten days. That it be not *permissive*, but *imperative*. The arrangements of the quarantine to be such as will allow of the complete separation of all suspected and diseased animals from the healthy, having isolated sheds for each class—the owner of the stock to pay for all the food and attendance during the time they remain in quarantine.

The only manner by which we can prevent or suppress these foreign contagious diseases from ravishing our herds is for the government to give to the veterinary profession that recognition which a science of such paramount importance deserves. Who are capable of advising government on matters relating to the diseases of stock, if not this profession? It is a standing reproach to this great country that so far we have received almost no encouragement at the hands of the government. The government ought certainly to appoint a veterinary department, both civil and military—the former to manage all matters relating to veterinary sanitary measures, that none be appointed to any position as inspectors or veterinary surgeons to regiments except regular graduates of recognized colleges. Each State should have its own consulting veterinary surgeon, paid by the State, who could be consulted and deal at once with any outbreak of disease.

We are liable at any time to have one or more of these epizootic diseases sweep over the whole length and breadth of our continent, and then, when every herd and flock bear the sad impress of disease, the *government* and *people* will realize what tremendous risks they have been incurring by not encouraging the growth of a scientific veterinary profession, and by not having competent men at every port of entry to guard against the *introduction* of these fatal infectious diseases. Above all others it is the duty of agricultural societies to do all in their power toward the establishment and support of veterinary colleges; that there may be those among us who can intelligently minister to the wants of animals, both in health and disease. In conclusion, gentlemen, let me impress upon this board the importance of getting the government *alive to the facts* that it is necessary for our best interests to adopt *preventive measures* to insure us against

the scourge of disease, and that the time has now come when we cease appointing ignorant and unqualified men to fill responsible positions, while there are educated veterinarians among us, who would discharge the duties devolving upon them with credit alike to the government and the veterinary profession.

Let us feel the full force of the maxim that "in times of peace prepare for war," and instead of keeping our ports *invitingly* open, as we are now doing, to the entrance of these diseases, let *active* and *decisive* measures be enacted that we may be saved the lives of thousands of cattle and millions of money.

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## HOG CHOLERA.

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BY CHARLES B. MICHENER, *Veterinary Surgeon of the Pennsylvania State Board of Agriculture.*

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Hog cholera, known under the different names of typhus of French, blue sickness, red soldier, gastro-enteritis, etc., etc., is a blood disease, and is classed under the general head of anthrax.

Anthrax diseases originate, principally, where there is much decomposition of animal matter; in wet, swampy places, during hot, rainy weather, and among animals that pasture on low, clayey, river lands or marshes. The general symptoms which characterize these diseases, are the following:

Mostly epizootic or enzootic, rarely sporadic; run their course quickly; extravasation or exudation of blood; tendency to gangrene; alteration in the blood; have an incubative stage; blood more or less fluid, though thick; more common in old countries, attacking first the most robust, but sparing none in its ravages, and may or may not have local symptoms.

Hog cholera is, no doubt, a contagious disease, having an incubative stage of four to eight days, and is propagated by mingling with infected pigs, by throwing the excrements, etc., of sick animals where healthy ones are pasturing; though more frequently through the media of the water and food.

The first few pigs will die, often, before any notice is taken of them being sick. On careful observation, we note that the temperature of the body varies; animal staggers; bury themselves in the straw; urine and fæces scanty; lie on the abdomen; suffer colicky pains, and may be delirious or comatose. Paraplegia and diarrhoea often set in in the latter stages of disease. The skin presents numerous red or purple spots, par-



ticularly on the abdomen, inside the thighs, back, and ears. At first, by pressure, these spots disappear. The pulse, though small and weak, is rapid. As the disease advances, the diarrhœa becomes profuse, very offensive, and of a dark color. At times the diarrhœa is entirely absent, and the fœces are continually voided in hard lumps, coated with patches of mucous membrane. Breathing impeded, owing to congestion of the lungs.

Post mortem examinations reveal these lessons. Skin entirely red, or the red color limited to spots or diffused patches. The mucous membrane of the stomach shows streaks of congestion, or the presence of ulcers. The ileum and cæcum are mostly found ulcerated. These ulcers are covered by a deposit of diffused lymph. Tissue of the spleen is soft and easily broken down. Liver and lungs congested; ecchymosis on heart and lining membranes as well, also, as on the pleura and peritoneum. The blood is disorganized, and contains numerous bachtiria, vibrous, etc., etc. The treatment resolves itself into preventive and curative. To prevent the disease, avoid all means of contagion. If in a pen, have it dry and built on high land. Change the diet, and insist on strict cleanliness. Antiphlogistic measures are to be resorted to at the outset. Give an emetic, followed by saline purgatives, mixed with ginger and ale. Wash the surface of the body with cold water. Give plenty of exercise on the ground. Complications must be met as they develop themselves, and the indications for treatment carried out by the attending veterinarian.

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## SUMMARY OF EXPERIMENTS ON THE EASTERN EXPERIMENTAL FARM.

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BY JOHN J. CARTER, *Superintendent.*

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I have compiled from our records the results of a series of experiments, made to test the different manners of sowing wheat and oats, and the treatment of the growing grain. It will be noticed that the experiments indicate results varying considerably in the different years, owing, probably, to climatic influences, and different conditions of the soil, &c. In summing up the final results, the general averages have been taken, and the per cent. of gain or loss given, of one plan over another. It would make this report too obscure and cumbersome to give all the details, as entered in our books, and shall, therefore, make the tables as simple as possible.



